SITE NEED STATEMENT

General Reference Information

Need Title:	**Radiological Contamination Detection Capability**
Need Code:	NV23-0200-10
Need Summary:	An improved method is needed to locate and identify radioactive waste in the subsurface that minimizes the amount of waste generated and the potential for worker exposure. Radioactive contamination buried beneath several feet of earth is hidden from surface detection and effectively shielded.
Origination Date:	August 1, 2001
Need Type:	Technology
Operations Office:	NNSA/NV
Geographic Site Name:	Nevada Test Site
Project:	NV214/Industrial Sites
National Priority:	Medium
Operations Office Priority:	10 of 13

Problem Description Information

Operations Office Program Description:	The NNSA/NV Environmental Restoration Program encompasses activities that assess the degree of contamination resulting from the testing program at the Nevada Test Site, the Nellis Air Force Range, the Tonopah Test Range, and eight offsite locations, and performs actions required by federal and state regulations. The objects of the Program are to: (1) identify the nature and extent of the contamination, (2) determine its potential risk to the public and the environment, and (3) perform the necessary corrective actions in compliance with applicable regulatory guidelines and requirements.
Need/Problem Description:	Radioactive materials have been disposed of in solid and liquid forms at various locations at the NTS. Traditional sampling methods for analysis pose higher waste volume generation and increased risk of worker exposure. There are six to ten sites in Area 25 of the Nevada Test Site including landfills, dumps, and leach fields which could benefit from this technology. Better understanding of soil attenuation, gamma ray energies and detector response relationships, and data interpretation limits and constraints needs to be obtained.
Functional Performance Requirements:	A radiation detection system is needed that: • Can be inserted into the subsurface without creating unnecessary waste • Will allow the detection and location of radioactive contaminants and possible areas of migration without the attendant hazards • Will reduce the risk of exposure to workers. A method is required for locating, identifying, and measuring subsurface radioactive contamination in three-dimensional space, behind the shielding of earth material.
Definition of Solution:	The Spectral Gamma Probe and Cone Penetrometer technology has been successfully used to detect radioactive waste in a landfill and to identify areas where confirmatory sampling should be completed. However, some improvements are needed in areas of detector calibration, detection/radionuclide identification, measurement, and native soil penetration.
Targeted Focus Area:	Subsurface Contaminants
Potential Benefits:	Benefits include elimination of increased generation of radioactive waste and risk of worker exposure.
Potential Cost Savings:	Cost saving are estimated to range from several tens of thousands to a few hundred thousands of dollars depending on the Corrective Action Unit (CAU).
Potential Cost Savings Narrative:	Cost savings would be expected as a result of reduced sample collection and analytical costs.
Technical Basis:	Radiation contamination in the subsurface soil cannot be located or identified without drilling or excavation.
Cultural/Stakeholder Basis:	These waste sites are being investigated to ascertain their potential impact on groundwater and other receptors.
Environment, Safety, and Health Basis:	Potential exposure to personnel could occur when material is extracted from the earth by the drilling. Drilling will produce larger volumes of waste than does use of

	the CPT which is advantageous from a waste minimization/pollution prevention standpoint.
Regulatory Drivers:	Characterization and remedial actions are required by the FFACO. Characterization, alternatives selection, and remedial action processes are specified. Although the use of any specific technology is not specified, the use of technologies to enhance the process of characterization or remediation or to provide cost or risk benefits and the overall efficiency of the environmental restoration program is encouraged.
Milestones:	Not applicable
Material Streams:	Treated MLLW Soil to NTS Disposal (1226).
TSD System:	TBD Technology (789). Technical risk score 3. Not on critical path to closure. LLW on-site disposal or LLW/Mixed waste disposal if excavation is required
Major Contaminants:	Radioactive contaminants associated with NTS testing and disposal activities associated with specific CAUs
Contaminated Media:	Buried waste and soil materials
Volume/Size of Contaminated Media:	Varies with specific CAU
Earliest Date Required:	2001
Latest Date Required:	2003

Baseline Technology Information

Baseline Technology Process:	Drilling with frequent stops for radiation monitoring and sampling
Life-Cycle Cost Using Baseline:	Life-Cycle Cost for field investigation ranges from several tens of thousands to a several hundred thousands of dollars depending on the specific waste dump CAU – See IPABS for details
Uncertainty on Baseline Life-Cycle Cost:	The project has low technical risk, therefore uncertainties are not a significant factor in the baseline.
Completion Date Using Baseline:	2003

Points of Contact (POC)

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